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60/041,855	9 April 1997 (09.04.97)	US	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
60/044,247	23 April 1997 (23.04.97)	US		
08/900,193	25 July 1997 (25.07.97)	US		
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(74) Agents: STRATTON, Robert, P. et al.; Gowling, Strathy & Henderson, Suite 4900, Commerce Court West, Toronto, Ontario M5L 1J3 (CA).				
(54) Title: UV MICROSCOPE CONVERTING UV IMAGE TO VISIBLE COLOR IMAGE				
(57) Abstract				
<p>A color translating UV microscope for research and clinical applications involving imaging of living or dynamic samples in real time and providing several novel techniques for image creation, optical sectioning, dynamic motion tracking and contrast enhancement comprises a light source emitting UV light, and visible and IR light if desired. This light is directed to the condenser via a means of selecting monochromatic, bandpass, shortpass, longpass or notch limited light. The condenser can be a brightfield, darkfield, phase contrast or DIC. The slide is mounted in a stage capable of high speed movements in the X, Y and Z dimensions. The microscope uses broadband, narrowband or monochromat optimized objectives to direct the image of the sample to an image intensifier or UV sensitive video system. When an image intensifier is used it is either followed by a video camera, or in the simple version, by a synchronized set of filters which translate the image to a color image and deliver it to an eyepiece for viewing by the microscopist. Between the objective and the image intensifier there can be a selection of static or dynamic switchable filters. The video camera, if used, produces an image which is digitized by an image capture board in a computer. The image is then reassembled by an overlay process called color translation and the computer uses a combination of feedback from the information in the image and operator control to perform various tasks such as optical sectioning and three dimensional reconstruction, coordination of the monochromator while collecting multiple images sets called image planes, tracking dynamic sample elements in three space, control of the environment of the slide including electric, magnetic, acoustic, temperature, pressure and light levels, color filters and optics, control for microscope mode switching between transmitted, reflected, fluorescent, Raman, scanning, confocal, area limited, autofluorescent, acousto-optical and other modes.</p>				

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## INT'L NATIONAL SEARCH REPORT

International Application No

PCT/CA 98/00350

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 6 G02B21/16 G01N21/64

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 6 G02B G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ZWORYKIN ET AL.: "Ultraviolet Television Color-Translating Microscope" SCIENCE, vol. 126, no. 3278, 25 October 1957, pages 805-810, XP002075463 cited in the application see page 805 - page 807; figure 4	35, 39, 49
Y	---	1, 3, 4, 7-10
Y	US 5 149 972 A (FAY FREDERIC ET AL) 22 September 1992 see column 9, line 26 - line 50; figure 1	1, 3, 4, 7-10
X	US 5 481 401 A (KITA NOBUHIRO ET AL) 2 January 1996 cited in the application see column 16, line 28 - column 17, line 43; figure 9	16
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	-/-	

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## \* Special categories of cited documents :

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

25 August 1998

17. 12. 98

Name and mailing address of the ISA

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VON MOERS, F

## INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 98/00350

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 233 197 A (BOWMAN DOUGLAS ET AL) 3 August 1993 see column 3, line 59 - column 7, line 17; figure 2 ---	1,4,7, 16,39
A	PATENT ABSTRACTS OF JAPAN vol. 011, no. 015 (P-536), 16 January 1987 & JP 61 189515 A (CANON INC), 23 August 1986 see abstract -----	1

# INTERNATIONAL SEARCH REPORT

In. .ational application No.  
PCT/CA 98/00350

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-27, 35-49

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-27, 35-49

UV microscope converting observed light of different UV wavelength regions to different visible wavelengths thereby converting the UV image to a visible coloured image.

2. Claims: 28-30

Active feedback control of the microscope illumination.

3. Claim : 31

Computer controlled selection of brightfield, or darkfield, or other observation modes.

4. Claim : 32

Computer controlled switching of objective lens.

5. Claim : 33

Computer controlled switching of the image intensifier

6. Claim : 34

Computer controlled switching of the video camera

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

Application No

PCT/CA 98/00350

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5149972 A	22-09-1992	NONE	
US 5481401 A	02-01-1996	JP 5127096 A	25-05-1993
US 5233197 A	03-08-1993	NONE	